This document demonstrates how LIST Web Services can be added to commonly used spatial applications (including ArcMap, MapInfo, QGIS, ArcGIS Online, ArcGIS Pro, OruxMaps, MotionX-GPS, and AutoCAD Civil 3D)

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LIST Spatial Web Services

What is the LIST?

The Land Information System Tasmania (the LIST) is a whole-of-government online infrastructure that helps you find and use information about land and property in Tasmania. The LIST can be accessed by visiting www.thelist.tas.gov.au. The LIST is comprised of a number of components, which are briefly summarised below:

- The **Properties and Titles** search facility of the LIST enables you to find and obtain a range of property and title documents and information, including land titles, survey plans, government valuations, property reports and sales data
- **LISTmap** is a free, easy to use, online map application that allows you to view, create and share your own customised maps of Tasmania
- **LISTdata** is a free, easy to use online data portal that helps you discover, use and reuse a wide range of Tasmanian location-based information, and provides a central access point to connect to or download authoritative government data, including Open Data
- **LISTservices** are free web service endpoint(s) that can be integrated into your business systems and applications via spatial web services

What are spatial web services?

A web service is a software system which supports communication between one computer and another computer over a network. The LIST web services enable users to access and use authoritative spatial datasets from the Department of Primary Industries, Parks, Water and Environment (DPIPWE) in a variety of ways, through standard internet protocols.

This document details ways in which users can connect to the spatial web services using the most common GIS applications and tools.
LIST web services

- Allow users to access and use core authoritative spatial datasets while eliminating a lot of the management overhead for the provision, storing and maintenance of that data;
- Allow users to receive ongoing current and dynamic feeds of public and basemap data into their business system;
- Can be consumed in mobile applications;
- Can be used for development purposes; and
- Can be used directly in numerous spatial systems or Geographical Information System (GIS) platforms, some of which are covered in this document.

How to access LIST spatial web services

LIST datasets can be accessed via the following web service portal:

- **ArcGIS** - delivering REST services, predominantly used by (but not limited to) Esri software. ArcGIS also provides Open Geospatial Consortium (OGC) compliant web services, supported by most spatial applications and systems. The LIST ArcGIS REST and OGC services can be accessed via the following URL:

  http://services.thelist.tas.gov.au/arcgis/rest

Why are there multiple LIST spatial web service protocols?

The **ArcGIS Server REST services** are not always accessible via non-Esri products so support for ‘Open Geospatial Consortium’ (OGC) compliant web services (such as WMTS, WMS or WFS) have also been enabled.

Additional information and links to these supported protocols can be found below.
ArcGIS server and supported protocols

The LIST ArcGIS REST services can be accessed via the following URL:
http://services.thelist.tas.gov.au/arcgis/rest

What is an ArcGIS server?

ArcGIS Server is the core server geographic information system (GIS) software made by Esri. ArcGIS Server is used for creating and managing GIS Web services, applications, and data. ArcGIS Server is typically deployed on-premises within the organization’s service-oriented architecture (SOA) or off-premises in a cloud computing environment.


Supported protocols

REST

Representational State Transfer (REST) is a software architecture style consisting of guidelines and best practices for creating scalable web services. REST is a coordinated set of constraints applied to the design of components in a distributed hypermedia system that can lead to a more performant and maintainable architecture. RESTful systems typically, but not always, communicate over the Hypertext Transfer Protocol with the same HTTP verbs (GET, POST, PUT, DELETE, etc.) used by web browsers to retrieve web pages and send data to remote servers.


WMTS (limited as not all services support WMTS)

A Web Map Tile Service (WMTS) is a standard protocol for serving pre-rendered georeferenced map tiles over the Internet. The specification was developed and first published by the Open Geospatial Consortium in 2010.


As WMTS provides better performance for the end user, it is recommended to use WMTS over WMS if available.
WMS

A Web Map Service (WMS) is a standard protocol for serving georeferenced map images over the Internet that are generated by a map server using data from a GIS database. The specification was developed and first published by the Open Geospatial Consortium in 1999.


WFS (limited as not all services support WFS)

The Open Geospatial Consortium Web Feature Service Interface Standard (WFS) provides an interface allowing requests for geographical features across the web using platform-independent calls. One can think of geographical features as the ‘source code’ behind a map, whereas the WMS interface or online tiled mapping portals like Google Maps return only an image, which end-users cannot edit or spatially analyze.


Licensing and usage

All LIST data is subject to copyright, and a range of licence conditions also govern the use of the data. These licensing conditions must be adhered to when using LIST web services. Before accessing the LIST web services, please read the LIST Web Services Terms and Conditions (http://listdata.thelist.tas.gov.au/public/LISTWebServicesTermsConditions.pdf).

The licence that applies to a particular dataset is identified at the Service and Layer levels of LIST web services, under Copyright Text.

Note: It is important to check the Copyright Text for both the Service and the Layer, as the multiple layers within a service may have different licence conditions.
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Please see [http://creativecommons.org/licenses/by-nc-nd/3.0/au/](http://creativecommons.org/licenses/by-nc-nd/3.0/au/) for full details.

Standard Government Copyright Statement

Where the standard LIST copyright text appears (see below), the Data is subject to Crown Copyright provisions as defined by the Copyright Act 1968. The Data is to be used internally within your organisation to support the execution of your usual business activities.

**Copyright Text:** the LIST State of Tasmania

However, if the Data will be incorporated into another product, distributed or on-sold in any way, you must contact LIST Help Desk on (03) 6165 4444, or via email listhelp@dpipwe.tas.gov.au, to obtain permission before use. Please note that a fee may be applicable.
No visible license agreement

Where there is no Copyright Text visible for a particular dataset, you must assume that Creative Commons does not apply, and the dataset is not available for free under Open Data. Please contact the LIST Help Desk on (03) 6165 4444, or via email listhelp@dpipwe.tas.gov.au, to clarify licensing before usage.

Metadata

LIST datasets have detailed metadata records that provide further information about the datasets. You can access these via LISTdata: data.thelist.tas.gov.au

LISTdata is a free, easy to use online data portal that helps you discover, use and reuse a wide range of Tasmanian location-based information, and provides a central access point to connect to or download authoritative government data, including Open Data.

Spatial reference systems

The following is a list of the supported spatial reference systems (SRS) for the LIST web services.

- **EPSG:3857** – WGS84 Web Mercator (Auxiliary Sphere) – default SRS for all of the LIST’s spatial web services
- **EPSG:4326** – WGS84 Longitude-Latitude
- **EPSG:102100** – ESRI’s Web Mercator
- **EPSG:28355** – GDA94 / MGA Zone 55
- **EPSG:4283** – GDA94 Longitude-Latitude
Quick Access Guide

The LIST ArcGIS REST services can be accessed via the following URL:

http://services.thelist.tas.gov.au/arcgis/rest

Adding a basemap

The most common task for most spatial applications is to load an initial context map or basemap. There are a variety of basemaps supplied via the LIST REST Web Services (http://services.thelist.tas.gov.au/arcgis/rest/services/Basemaps).

Where possible, and if the application supports, use the REST service for optimal performance. The next best option is WMTS, then WMS followed by WFS.

To add a basemap in your application please refer to the following sections:

- ArcMap - Adding ArcGIS REST Services to ArcMap or Adding WMTS Services to ArcMap
- MapInfo - Adding REST Tile Services to MapInfo
- QGIS - Adding WMTS Services to QGIS
- ArcGIS Online - Adding ArcGIS REST Services to ArcGIS Online
- ArcGIS Pro - Adding ArcGIS REST Services to ArcGIS Pro
- OruxMaps - Adding REST Tile Services (Basemaps) to OruxMaps
- MotionX-GPS - Adding REST Tile Services (Basemaps) to MotionX-GPS
- AutoCAD Civil 3D - Adding ArcGIS REST Services to AutoCAD Civil 3D

Adding services other than basemaps

Where possible, use the REST services for vector based datasets for optimal performance. The next best option is WMS, followed by WFS.

To add a vector based service to your application, please refer to the following sections:

- ArcMap - Adding ArcGIS REST services to ArcMap or Adding WMS services to ArcMap or Adding WFS services to ArcMap
- MapInfo - Adding WMS services to MapInfo or Adding WFS services to MapInfo
- QGIS - Adding WMS services to QGIS or Adding WFS services to QGIS
- ArcGIS Online - Adding ArcGIS REST services to ArcGIS Online or Adding WMS services to ArcGIS Online
- **ArcGIS Pro** - [Adding ArcGIS REST services to ArcGIS Pro](#)
- **OruxMaps** - [Adding WMS services to OruxMaps](#)
- **AutoCAD Civil 3D** - [Adding ArcGIS REST services to AutoCAD Civil 3D](#) or [Adding WMS services to AutoCAD Civil 3D](#)
How to get the correct web service URL

**URLs for ArcGIS server REST services**

- In a web browser, enter the following URL: [http://services.thelist.tas.gov.au/arcgis/rest](http://services.thelist.tas.gov.au/arcgis/rest). This URL is often all that is required for many applications that support ArcGIS server REST services. Entering this basic URL will give access to all the folders and services contained within via the application’s navigation pane.

- To enter specific REST end points, drill down through the folders and services then copy the URL found in the web browser’s address bar.

- A basemap URL will look like the following:
• A non-basemap service URL containing numerous layers will look like this:

![ArcGIS REST Services Directory](services.thelist.tas.gov.au/arcgis/rest/services/Public/TopographyAndRelief/MapServer)

- **Public/TopographyAndRelief (MapServer)**
  - View In: ArcGIS JavaScript, ArcGIS.com Map, Google Earth, ArcMap, ArcGIS Explorer
  - View Footprint In: ArcGIS.com Map
  - Service Description:

• An individual layer or REST end point URL will look like the following:

![ArcGIS REST Services Directory](services.thelist.tas.gov.au/arcgis/rest/services/Public/TopographyAndRelief/MapServer/0)

- **Layer: Facilities (ID: 0)**
- **Name:** Facilities

### URLs for ArcGIS server WMS, WMTS or WFS services

• The majority of services have WMS capabilities but only certain services have WMTS capabilities under [http://services.thelist.tas.gov.au/arcgis/rest](http://services.thelist.tas.gov.au/arcgis/rest). WFS is available via one service: [http://services.thelist.tas.gov.au/arcgis/rest/services/Public/OpenDataWFS/MapServer](http://services.thelist.tas.gov.au/arcgis/rest/services/Public/OpenDataWFS/MapServer). To see which service has either WMS or WMTS enabled, drill down to the service level and look for either WMTS or WMS in the top left hand corner of the page.

• If they are enabled, click on the links
For **WMTS** copy the URL up to and including the first WMTS, for example:

![WMTS Example](image1)

For **WMS** copy the URL up to and including WMSServer, for example:

![WMS Example](image2)

For **WFS** copy the URL up to and including WFSServer, for example:

![WFS Example](image3)
Adding services in common GIS platforms

The following instructions are provided as a guide only. For more detailed instructions please refer to the vendor's online help or click on the reference links found under References for spatial applications at the end of this document.

How to add services in ArcMap Version 10.3

Adding ArcGIS REST services to ArcMap

**Note:** Please refer to Clear Display Cache in ArcMap before adding a LIST basemap

- Within ArcMap, if the catalog pane is not already open, click on the open Catalog button or click on the Windows menu and select Catalog to view the pane

- In your Catalog pane expand GIS Servers then click on Add ArcGIS Server
• Select **Use GIS services** then click Next

![Image of Add ArcGIS Server dialog]

• In the **Service URL** box type in the following URL **http://services.thelist.tas.gov.au/arcgis** and leave the **User Name** and **Password** blank then click **Finish**

![Image of Add ArcGIS Server connection dialog]
• Expand the folders to see the available services and click and drag the service into your mxd (or ArcMap document) to load all the layers for that service

Adding WMTS services to ArcMap

For the best performance, it is recommended to use the ArcGIS REST services as detailed in Adding ArcGIS REST Services to ArcMap. WMTS is only available on some of the LIST basemap services found under http://services.thelist.tas.gov.au/arcgis/rest/services/Basemaps.

• Within ArcMap, if the catalog pane is not already open, click on the open Catalog button or click on the Windows menu and select Catalog to view the pane
• In your Catalog pane expand **GIS Servers** then click on **Add WMTS Server**

![Catalog pane screenshot](image)

• In the **URL** text box, type in a valid URL such as [http://services.thelist.tas.gov.au/arcgis/rest/services/Basemaps/Orthophoto/ImageServer/WMTS](http://services.thelist.tas.gov.au/arcgis/rest/services/Basemaps/Orthophoto/ImageServer/WMTS). *(Please refer to [http://services.thelist.tas.gov.au/arcgis/rest/](http://services.thelist.tas.gov.au/arcgis/rest/) to see what services have WMTS enabled and look for WMTS in the top left corner)*

![ArcGIS REST Services Directory](image)
Click Get Layers to make sure the URL is valid, and if it is, click OK to add the service to the catalog pane.

Expanding the folders to see the available services and click and drag the layer to add it to your mxd (or ArcMap document).
Adding WMS services to ArcMap

For the best performance, it is recommended to use the ArcGIS REST services as detailed in Adding ArcGIS REST Services to ArcMap. WMS is only available on most of the LIST services found under http://services.thelist.tas.gov.au/arcgis/rest/services but not all.

- Within ArcMap, if the catalog pane is not already open, click on the open Catalog button or click on the Windows menu and select Catalog to view the pane.

- In your Catalog pane expand GIS Servers then click on Add WMS Server.
• In the URL box type in the following URL
  http://services.thelist.tas.gov.au/arcgis/services/Public/TopographyAndRelief/MapServer/WMSServer then click Get Layers to see what is available followed by the OK button. Check the LIST's ArcGIS REST web services to see if WMS is enabled on a service (look for WMS in the top left corner)

• For example, the following URL will also allow you to add the topographic basemap:
  http://services.thelist.tas.gov.au/arcgis/services/Basemaps/Topographic/ImageServer/WMSServer?

• Expand the folders to see the available services and click and drag the layer to add it to your mxd (or ArcMap document)
Adding WFS services to ArcMap

For the best performance, it is recommended to use the ArcGIS REST services as detailed in Adding ArcGIS REST Services to ArcMap. WFS is only available via the following URL (http://services.thelist.tas.gov.au/arcgis/rest/services/Public/OpenDataWFS/MapServer).

- In order to use WFS in ArcMap, the ArcGIS Interoperability Extension for Desktop must be installed but doesn’t need to be enabled. To check if you have this extension installed, from within your ArcMap document, click on the Customize menu option then the Extensions… menu option.

- If the extension has been installed, there will be a Data Interoperability option in the list of extensions. It does not need to be enabled to proceed but it does have to be in the list of extensions.
• Within ArcMap, if the catalog pane is not already open, click on the open **Catalog** button or click on the **Windows** menu and select **Catalog** to view the pane.

![Catalog pane in ArcMap](image1)

• In your Catalog pane expand **Interoperability Connections** then click on **Add Interoperability Connection**.

![Interoperability Connections in ArcMap](image2)

• Select **WFS (Web Feature Service)** from the drop down list next to **Format:**; then click on the **Parameters...** button.

![WFS Interoperability Connection](image3)
• In the **URL** box type in the following URL:
  http://services.thelist.tas.gov.au/arcgis/services/Public/OpenDataWFS/MapServer/WFSServer then click the three dots button next to **Feature Types** and click on the check box next to the desired layer. Please be aware that this service has a 2,000 maximum feature limit on each layer for performance requirements. To see more than the first 2,000 records, an XML Filter Expression needs to be included, however, formatting such a request is not covered in this document.

  ![Feature Types Selection](image)

• After selecting the desired layer or layers, click **OK** on all the open windows
• Expand the new connection in ArcCatalog and click and drag the layer to add it to your mxd (or ArcMap document)

![ArcCatalog screen shot]

Clear Display Cache in ArcMap

When regularly using the LIST basemaps (http://services.thelist.tas.gov.au/arcgis/rest/services/Basemaps) it is good practice to clear the ArcMap display cache as it may mask any updates carried out on those basemaps.

• Within ArcMap, remove any basemaps from the document then click on the Customize menu option, then click on ArcMap Options.

• Click on the Display Cache tab and then click on Clear Cache. This may take some time if the display cache is large. Click OK to dismiss the window when the cache has been cleared.

![ArcMap Options screen shot]
• The cache options for any added basemap can also be altered by right clicking on the basemap within the ArcMap document and clicking on Properties.

• Within the Properties dialog window, click on the Cache tab and select the desired caching option, then click OK to apply those settings.
How to add services in MapInfo Pro Version 12.5

Adding REST tile services to MapInfo

MapInfo does not directly support REST tile services but if you follow the steps below, it can be added indirectly. Please note that this is the best way to access the LIST basemaps in MapInfo as it offers better performance than simply accessing the WMS service for the same basemaps. Any error messages can be mitigated by zooming into the extent of Tasmania or preloading a layer into MapInfo.

Adding the topographic basemap

- In a text editor such as Notepad or Notepad++ type in the following lines:

```xml
<?xml version="1.0" encoding="utf-8"?>
<TileServerInfo Type="LevelRowColumn">
  <Url>http://services.thelist.tas.gov.au/arcgis/rest/services/Basemaps/Topographic/ImageServer/tile/{LEVEL}/{COL}/{ROW}?.png</Url>
  <MinLevel>3</MinLevel>
  <MaxLevel>18</MaxLevel>
  <TileSize Height="256" />
  <AttributionText Font="Font ("Tahoma",257,8,16777215,0)">the LIST © State of Tasmania</AttributionText>
</TileServerInfo>
```

- Save the above file as ListTopoBasemap.xml. Alternatively, download the file from https://github.com/DPIPWE/list-spatial-web-service-examples/tree/master/MapInfo.

- Then in a new blank document, type in the following text:

```
!table
!version 1050
!charset WindowsLatin1

Definition Table
File "ListTopoBasemap.xml"
Type "TILESERVER"
CoordSys Earth Projection 10, 157, "m", 0 Bounds (-20037508.3428, -20037508.343) (20037508.3428, 20037508.343)
ReadOnly
```
• Save the above file as **ListTopoBasemap.TAB** in the same location as **ListTopoBasemap.xml**. Alternatively, download the file from [https://github.com/DPIPWE/list-spatial-web-service-examples/tree/master/MapInfo](https://github.com/DPIPWE/list-spatial-web-service-examples/tree/master/MapInfo).

• To view the REST tile service in MapInfo, click on the **Open** button then on the **Table** button and navigate to where you saved the .xml and .TAB files.

• To avoid drawing errors and decrease waiting time for the data to load, pre-load another layer and zoom into a section of it.
Adding the orthophoto basemap

- In a text editor such as Notepad or Notepad++ type in the following lines:

```xml
<?xml version="1.0" encoding="utf-8"?>
<TileServerInfo Type="LevelRowColumn">
  <MinLevel>6</MinLevel>
  <MaxLevel>19</MaxLevel>
  <TileSize Height="256" />
  <AttributionText Font="Font (&quot;Tahoma&quot;,257,8,16777215,0)">the LIST © State of Tasmania</AttributionText>
</TileServerInfo>
```

- Save the above file as ListOrthoBasemap.xml. Alternatively, download the file from https://github.com/DPIPWE/list-spatial-web-service-examples/tree/master/MapInfo.
• Then in a new blank document, type in the following text:

```plaintext
!table
!version 1050
!charset WindowsLatin1

Definition Table
  File "ListOrthoBasemap.xml"
  Type "TILESERVER"
  CoordSys Earth Projection 10, 157, "m", 0 Bounds (-20037508.3428, -20037508.343) (20037508.3428, 20037508.343)
  ReadOnly
```

• Save the above file as `ListOrthoBasemap.TAB` in the same location as `ListOrthoBasemap.xml`. Alternatively, download the file from [https://github.com/DPIPWE/list-spatial-web-service-examples/tree/master/MapInfo](https://github.com/DPIPWE/list-spatial-web-service-examples/tree/master/MapInfo).
• To view the REST tile service in MapInfo, click on the **Open** button then on the **Table** button and navigate to where you saved the .xml and .TAB files.

• To avoid drawing errors and decrease waiting time for the data to load, pre-load another layer and zoom into a section of it.
Adding other basemaps

- For the Topographic Gray Scale basemap, follow the steps above but create the following files first:

```xml
<?xml version="1.0" encoding="utf-8"?>
<TileServerInfo Type="LevelRowColumn">
    <Url>http://services.thelist.tas.gov.au/arcgis/rest/services/Basemaps/TopographicGrayScale/ImageServer/tile/{LEVEL}/{COL}/{ROW}?.png</Url>
    <MinLevel>3</MinLevel>
    <MaxLevel>18</MaxLevel>
    <TileSize Height="256" />
    <AttributionText Font="&quot;Tahoma&quot;"&gt;the LIST © State of Tasmania&lt;/AttributionText&gt;
</TileServerInfo>
```

- Save the above file as ListTopoGrayBasemap.xml. Alternatively, download the file from https://github.com/DPIPWE/list-spatial-web-service-examples/tree/master/MapInfo.

- Save the above file as ListTopoGrayBasemap.TAB in the same location as ListTopoGrayBasemap.xml. Alternatively, download the file from https://github.com/DPIPWE/list-spatial-web-service-examples/tree/master/MapInfo.
For the scanned **TASMAP basemap**, follow the steps above but create the following files first:

```xml
<?xml version="1.0" encoding="utf-8"?><TileServerInfo Type="LevelRowColumn">
  <MinLevel>6</MinLevel>
  <MaxLevel>16</MaxLevel>
  <TileSize Height="256"/>
  <AttributionText Font="&quot;Tahoma&quot;";257,8,16777215,0">the LIST &amp;#169; State of Tasmania</AttributionText>
</TileServerInfo>
```

- Save the above file as **ListScannedTASMAPbasemap.xml**. Alternatively, download the file from [https://github.com/DPIPWE/list-spatial-web-service-examples/tree/master/MapInfo](https://github.com/DPIPWE/list-spatial-web-service-examples/tree/master/MapInfo).

```
definitionTable
  !table
  !version 1050
  !charset WindowsLatin1
  !table
  !version 1050
  !charset WindowsLatin1

  Definition Table
  File "ListScannedTASMAPbasemap.xml"
  Type "TILESERVER"
  CoordSys Earth Projection 10, 157, "m", 0 Bounds (-20037508.3428, -20037508.343)
  (20037508.3428, 20037508.343)
  ReadOnly
```

- Save the above file as **ListScannedTASMAPbasemap.TAB** in the same location as **ListScannedTASMAPbasemap.xml**. Alternatively, download the file from [https://github.com/DPIPWE/list-spatial-web-service-examples/tree/master/MapInfo](https://github.com/DPIPWE/list-spatial-web-service-examples/tree/master/MapInfo).
Adding WMS services to MapInfo

- After opening MapInfo click on **Open** then select **Mapping (WMS)** under **Web Services**

- Click on the **Servers** button
Then click on **Add...** to create a new connection to LIST Web services

Type the following into the **Server URL:**

http://services.thelist.tas.gov.au/arcgis/services/Public/TopographyAndRelief/MapServer/WMSServer

Add a meaningful Description, then click the Test URL button to see if you can connect. Check the LIST’s [ArcGIS REST web services](http://services.thelist.tas.gov.au/arcgis/services/Public/TopographyAndRelief/MapServer/WMSServer) to see if WMS is enabled on a service (look for WMS in the top left corner)

For example, the following URL will also allow you to add the topographic basemap:

http://services.thelist.tas.gov.au/arcgis/services/Basemaps/Topographic/ImageServer/WMSServer?
• A working valid connection will return a window similar to the one below. Click **Close** to dismiss the window.

![WMS Server Details](image1)

• Then click **OK** to create the connection.

• From here, you can now access the layers and add them into MapInfo provided you select the new WMS Server from the drop down list.

![Open WMS Table](image2)
Adding WFS services to MapInfo

- After opening MapInfo click on **Open** then select **Feature (WFS)** under **Web Services**

![MapInfo screenshot showing the Open WFS Table window]

- Click on the **Servers** button

![MapInfo screenshot showing the WFS Server configuration window]
Then click on **Add…** to create a new connection to LIST Web services

- Type the following into the **Server URL**: http://services.thelist.tas.gov.au/arccgis/services/Public/OpenDataWFS/MapServer/WFSServer and add a meaningful **Description**, then click the **Test URL** button to see if you can connect.

- A working valid connection will return a window similar to the one below. Click **Close** to dismiss the window.
• Then click **OK** to create the connection

• From here, you can now access the layer and add it into MapInfo provided you select the new WFS Server from the drop down list. Use the **Data Filters** options to customise the data being accessed as well as the **Object Styles** to change the symbology. Please note that there is a 2,000 maximum feature limit on each layer for performance requirements for the LIST WFS service (http://services.thelist.tas.gov.au/arcgis/rest/services/Public/OpenDataWFS/MapServer).
How to add services in QGIS Version 2.8.2

Adding WMTS services to QGIS

For basemap services WMTS is the recommended format where available

- To add a WMTS layer to QGIS, click on the Add WMS/WMTS Layer button as shown in the image below
- Alternatively go to the Layer menu, select Add Layer, then Add WMS/WMTS Layer

For a new connection click on the New button
Type in a meaningful name in the Name text box then type in a URL from the LIST’s ArcGIS REST web services that has WMTS enabled (look for WMTS in the top left corner)

For example, http://services.thelist.tas.gov.au/arcgis/rest/services/Basemaps/Topographic/Image Server/WMTS and then click OK.

Then click on the Connect button to view the available tile sets
• Highlight a tile set that you wish to use and click Add

• The results are then loaded into QGIS. Please be aware that the initial extent may not be initially zoomed in to Tasmania.
Adding WMS services to QGIS

- To add a WMS layer to QGIS, either click on the **Add WMS/WMTS Layer** button as shown in the image below or go to the **Layer** menu select **Add Layer** then **Add WMS/WMTS Layer**

- For a new connection click on the **New** button
• Type a meaningful name in the **Name** text box then type in the URL for the desired WMS layers:

http://services.thelist.tas.gov.au/arcgis/services/Public/TopographyAndRelief/MapServer/WMSServer and click **OK**. Alternatively, check the LIST’s [ArcGIS REST web services](http://services.thelist.tas.gov.au/arcgis/services/Public/TopographyAndRelief/MapServer/WMSServer) to see if WMS is enabled on a service (look for WMS in the top left corner).

For example, the following URL will also allow you to add the topographic basemap:

http://services.thelist.tas.gov.au/arcgis/services/Basemaps/Topographic/ImageServer/WMSServer?

• Ensure that you have the correct connection selected from the drop down list then click on the **Connect** button to view the available layers, highlight a layer, change the coordinate system if required and click **Add** to add the layer to the map. This window will stay open if you want to add more layers or simply click the **Close** button to dismiss the window.
Adding WFS services to QGIS

- To add a WFS layer to QGIS, either click on the **Add WFS Layer** button as shown in the image below or go to the **Layer** menu select **Add Layer** then **Add WFS Layer**.

- For a new connection click on the **New** button.
• Type a meaningful name in the **Name** text box then type in the following URL: http://services.thelist.tas.gov.au/arcgis/services/Public/OpenDataWFS/MapServer/WFSServer and click **OK**.

![Connection window](image1)

• Ensure that you have the correct connection selected from the drop down list then click on the **Connect** button to view the available layers, highlight a layer, double click on it to add a filter expression if required, enable **Use title for layer name** and click **Add** to add the layer to the map. This window will stay open if you want to add more layers or simply click the **Close** button to dismiss the window. Please note that there is a 2,000 maximum feature limit on each layer for performance requirements for the LIST WFS service (http://services.thelist.tas.gov.au/arcgis/rest/services/Public/OpenDataWFS/MapServer).

![Layer selection window](image2)
How to add services in ArcGIS Online

Adding ArcGIS REST services to ArcGIS Online

- Open ArcGIS Online within your preferred internet browser via the following URL: http://www.arcgis.com/home/webmap/viewer.html

- Click on Modify Map in the top right hand corner

- Then click on Add – Add Layer from Web
• Select **An ArcGIS Server Web Service** from the drop down list

![Add Layer from Web](image)

• Then type in your desired LIST ArcGIS REST Service found under [http://services.thelist.tas.gov.au/arcgis/rest](http://services.thelist.tas.gov.au/arcgis/rest) such as [http://services.thelist.tas.gov.au/arcgis/rest/services/Basemaps/Topographic/ImageServer](http://services.thelist.tas.gov.au/arcgis/rest/services/Basemaps/Topographic/ImageServer). In this example, we are using the Topographic LIST basemap so it is possible to replace the default ESRI basemap by selecting **Use as Basemap** then click **Add Layer**

![Add Layer from Web](image)

• With ArcGIS Online, you can either add an entire service that contains multiple layers or just an individual layer. For example, type in the following URL for an individual layer [http://services.thelist.tas.gov.au/arcgis/rest/services/Public/CadastreAndAdministrative/MapServer/4](http://services.thelist.tas.gov.au/arcgis/rest/services/Public/CadastreAndAdministrative/MapServer/4) or this URL for every layer in the service [http://services.thelist.tas.gov.au/arcgis/rest/services/Public/CadastreAndAdministrative/MapServer](http://services.thelist.tas.gov.au/arcgis/rest/services/Public/CadastreAndAdministrative/MapServer)

![Add Layer from Web](image)
• If a layer is grey in the contents area, you may need to zoom further in to see it on the map
Adding WMS services to ArcGIS Online

For the best performance, it is recommended to use the ArcGIS REST services as detailed in [Adding ArcGIS REST Services to ArcGIS Online](#). WMS is only available on some of the LIST services found under [http://services.thelist.tas.gov.au/arcgis/rest/services](http://services.thelist.tas.gov.au/arcgis/rest/services).

- Open ArcGIS Online within your preferred internet browser via the following URL: [http://www.arcgis.com/home/webmap/viewer.html](http://www.arcgis.com/home/webmap/viewer.html)
- Click on **Modify Map** in the top right hand corner
Then click on **Add** and **Add Layer from Web**

- Select **A WMS OGC Web Service** from the drop down list and type in a valid WMS URL, *Please refer to [http://services.thelist.tas.gov.au/arcgis/rest](http://services.thelist.tas.gov.au/arcgis/rest)* to see what services have WMS enabled, look for WMS in the top left corner)

For example:  
• If a layer is grey in the contents area, you may need to zoom further in to see it on the map
How to add services in ArcGIS Pro Version 1.0

Adding ArcGIS REST services to ArcGIS Pro

- To add an ArcGIS Server connection to your ArcGIS Pro project, select the **INSERT** tab and click on the **Connections** drop down list, then select **New ArcGIS Server**

- Enter [http://services.thelist.tas.gov.au/arcgis/rest/services](http://services.thelist.tas.gov.au/arcgis/rest/services) as the **Server URL** and click **OK**
- Under the **Project** pane, expand the **Servers** folder then the recently created LIST REST server.

- To add a service, simply right click on. Select **Add To New Map** if a map did not already exist in the project, otherwise select **Add To Current Map**. Please be aware that you may need to zoom into the extent of Tasmania before the data is visible.
How to add web services in the mobile application OruxMaps (for Android)

Adding REST tile services (basemaps) to OruxMaps

- After installing the OruxMaps application on your Android mobile device, connect the mobile device to a computer and navigate to …oruxmapslmapfiles. To find the exact location, first open the OruxMaps application on your device, then click the Maps button in the top right, then Map settings. The exact location can be found under the Maps directory section.

- Copy the file called onlinemapsources.xml to your computer, and then open that file using a text editor such as notepad++ or notepad.

- Scroll down to the bottom of the file and insert the following text after the last </onlinemapsource> tag and before the last line with the tag </onlinemapsource>. Be sure to include all the text below, noting that it continues over three pages.

```xml
<onlinemapsource uid="701">
  <name>LIST Topographic Basemap</name>
  <url><![CDATA[http://services.thelist.tas.gov.au/arcgis/rest/services/Basemaps/Topographic/ImageServer/tile/{$z}/{$y}/{$x}?png]]></url>
  <website><![CDATA[<a href="http://services.thelist.tas.gov.au/arcgis/rest/services/Basemaps/Topographic/ImageServer" target="_blank">LIST Topographic Basemap</a>]]></website>
  <minzoom>3</minzoom>
  <maxzoom>18</maxzoom>
  <projection>MERCATORESFERICA</projection>
  <servers></servers>
  <httpparam name=""></httpparam>
  <cacheable>1</cacheable>
  <downloadable>0</downloadable>
  <maxtilesday>0</maxtilesday>
  <maxthreads>0</maxthreads>
  <xop></xop>
  <yop></yop>
  <zop></zop>
  <qop></qop>
  <sop></sop>
</onlinemapsource>

<onlinemapsource uid="702">
  <name>LIST Orthophoto Basemap</name>
  <url><![CDATA[http://services.thelist.tas.gov.au/arcgis/rest/services/Basemaps/Orthophoto/ImageServer/tile/{$z}/{$y}/{$x}?png]]></url>
</onlinemapsource>
```
• By adding the above text to the xml file, you will have access to the LIST’s Topographic, Topographic Grey Scale, Orthophoto and Scanned TASMAP basemaps. Save the file then copy and paste it back into your mobile device under …oruxmpas\mapfiles

• Open OruxMaps and zoom into Tasmania, then click the **Switch Map** button in the top right of the screen
• Then select the **Switch Map** icon

• Choose a basemap from the list
• If the text was copied correctly, the LIST basemap should now be displayed in OruxMaps
Adding WMS services to OruxMaps

If you are wanting to load the LIST basemaps, please use the method defined under Adding REST Tile Services to OruxMaps. By adding a WMS service in OruxMaps you may notice performance issues.

- Open OruxMaps then zoom into Tasmania, then press the Switch Map button in the top right of the screen. Please note that you will need to zoom in further than the extent of Tasmania, as some layers have zoom dependencies and may not show at this extent.

- Then select the Switch Map icon
• In the top right hand corner, click on the white **WMS** text

![WMS Text](image)

• Type in a valid URL for example
  
  http://services.thelist.tas.gov.au/arcgis/services/Public/CadastreAndAdministrative/MapServer/WMSServer, or check [LIST ArcGIS Server](#) for other services that support WMS capabilities (look for WMS in the top left corner)

![WMS URL](image)

Then click **OK**
• Select a layer from the available list then click **OK**

![Select layers screenshot](image)

• To test the layer, enter in a zoom level such as 12. If 12 does not bring up a test image, try higher zoom levels to zoom in a bit further. After successfully testing the service, enter in the required zoom levels (6 and 18 is enough to cover Tasmania) then type in a meaningful name and click **Create**

![WMS Creator screenshot](image)
• To add the WMS service, simply select the newly created layer from the WMS folder.

• If the layer does not show up within a couple of minutes, you may need to zoom in a little closer to view the data.
LIST Spatial Web Services

User Guide

- An alternative way to add WMS services is to edit the `wms_services.xml` file located in `…oruxmaps\mapfiles` on the mobile device. To find the exact location, first open the OruxMaps application on your device, then click the Maps button in the top right, then Map settings … the exact location can be found under the Maps directory section.

- Simply connect the mobile device to a computer, copy the file from `…oruxmaps\mapfiles` and paste it somewhere on the computer. Open the file in a text editor such as notepad++ or notepad and add the following code between the `<wms>` and `</wms>` tags, making sure that you do not delete any existing text. Be sure to include all the text below noting that it continues over two pages.

```xml
<wms>
  <name>LIST Orthophoto</name>
  <uid>751</uid>
  <desc>LIST Orthophoto</desc>
  <minzoomlevel>6</minzoomlevel>
  <maxzoomlevel>19</maxzoomlevel>
  <format>image/png</format>
  <coordinatesystem>EPSG:4326</coordinatesystem>
  <version>1.1.1</version>
</wms>

<wms>
  <name>LIST Topographic</name>
  <uid>752</uid>
  <desc>LIST Topographic</desc>
  <minzoomlevel>3</minzoomlevel>
  <maxzoomlevel>18</maxzoomlevel>
  <format>image/png</format>
  <coordinatesystem>EPSG:4326</coordinatesystem>
  <version>1.1.1</version>
</wms>

<wms>
  <name>LIST Topographic Gray Scale</name>
  <uid>753</uid>
  <desc>LIST Topographic Gray Scale</desc>
  <minzoomlevel>3</minzoomlevel>
  <maxzoomlevel>18</maxzoomlevel>
  <format>image/png</format>
  <coordinatesystem>EPSG:4326</coordinatesystem>
  <version>1.1.1</version>
</wms>
```
The above code will add the basemaps as a WMS service. For performance reasons, it is recommended to use the REST tile services when consuming the basemaps, as detailed in Adding REST Tile Services to OruxMaps. By editing the above examples you can add any of the LIST's WMS services in this manner. Save the file, then copy and paste it back into the mobile device under …oruxmaps\mapfiles. To add the WMS (if the code was entered correctly), select the Switch Map icon within OruxMaps.

Under the WMS folder choose one of the newly added services from the list.
How to add web services in the mobile application MotionX-GPS (for Apple’s iOS)

Adding REST tile services (basemaps) to MotionX-GPS

- After installing the MotionX-GPS application on your Apple mobile device, open the application and click on the Menu button at the bottom right of the screen.

- Then click on the Setup button.
Under **Custom Maps**, select **New**

- Type in a valid name for the service you want to add (in this example the **LIST's Topographic Basemap** and then a valid URL, for example: http://services.thelist.tas.gov.au/arcgis/rest/services/Basemaps/Topographic/Image Server/tile/[Z]/[Y]/[X].png.
- To enable local caching for offline use, change the **Download map for offline use** setting to ‘ON’ and ignore any warnings.
To set the new basemap in the application, select **Maps**, then under the **Custom** map catalog, select the new basemap service.
How to add services to AutoCAD Civil 3D 2015

Adding ArcGIS REST services to AutoCAD Civil 3D

Download and install AutoCAD service packs and ArcGIS for AutoCAD plugin

- Download and install the most current Service Packs for AutoCAD Civil 3D and AutoCAD Map 3D from http://knowledge.autodesk.com/support

- Download and install the ArcGIS for AutoCAD plugin from http://www.esri.com/software/arcgis/arcgis-for-autocad/download

IMPORTANT NOTE: A software bug has been detected in the ArcGIS for AutoCAD 350 software which results in REST Image Services not re-projecting in the coordinate system defined by the user. As a result, the Basemap Image Services are currently not available. A workaround exists for the Orthophoto and Topographic Basemaps by inserting them as a REST Map Service using the below processes.

Setting drawing limits prior to adding services

- The ArcGIS for AutoCAD installation will add a shortcut to your Start menu called ArcGIS for AutoCAD 350. Select this shortcut to begin your AutoCAD Civil 3D session.

- A security concern warning may be displayed, as AutoCAD does not automatically trust the recently installed ArcGIS for AutoCAD dll file. Click the Load button.

- As the service extents of some services cover the mainland of Australia, it is recommended that the zoom limits of your AutoCAD drawing file are restricted to the zoom level of Tasmania prior to adding services.
- Type **LIMITS** into the command line and click **Enter**

- Type **204000,5160000** into the command line and click **Enter** (coordinates are in GDA 1994 MGA Zone 55)

- Type **660000,5640000** into the command line and click **Enter** (coordinates are in GDA 1994 MGA Zone 55)

- Type **LIMITS** into the command line and click **Enter**

- Type **ON** into the command line and click **Enter**

The settings applied will enable the user to enter the command **ZL** (Zoom Limits) into the command line to display at the zoom level of Tasmania.
Adding ArcGIS REST services using ArcGIS for AutoCAD plugin

- Select the ArcGIS ribbon and click the Add Service button

- A warning will be displayed to indicate that a coordinate system has not been defined. Click the Assign button

- Select a coordinate system from the available options (e.g. GDA 1994 MGA Zone 55). Click the Open button. ArcGIS for AutoCAD uses the selected coordinate system to project ArcGIS web services on the fly in AutoCAD.
• Click the **New Server Connection** button

![New Server Connection](image)

• In the **Server URL** text box, type in a valid URL such as [http://services.thelist.tas.gov.au/arcgis/rest/services](http://services.thelist.tas.gov.au/arcgis/rest/services), and hit the **Tab** key. Leave the User Name and Password text boxes blank, and click the **Next** button.

![Specify Server Connection Information](image)

• Expand the folders in the **Select a GIS Service** dialog box to see the available services. Expand the categories to see the available layers within each service. Select the layers to add to the drawing by clicking in the **Check Box** adjacent to each layer name.
• Select the **Service** (e.g. Planning Online) and then to **Set bounding box from**: select **Drawing Limits** from the drop down list. Click the **Add** button followed by the **Close** button.

![Select a GIS Service](image)

• Type **ZL** (Zoom Limits) into the command line. The service is now displayed at the zoom level of Tasmania.

**NOTE:** The zoom level visibility and colour properties of each layer is defined by the service and cannot be modified. Additional zooming will be required to view some layers, and depending on the AutoCAD background colour, some layers may be difficult to view (e.g. cadastral boundaries are set to display as black). When panning, and zooming, services may take several seconds to refresh, depending on internet connection speeds.
Layers within each service can be toggled on and off using the check boxes within the GIS Contents dialog box.
Adding WMS services to AutoCAD Civil 3D

For better performance, it is recommended to use ArcGIS REST services rather than WMS. Please see Adding ArcGIS REST services to AutoCAD Civil 3D for more details.

Fix for dialog window display issue in AutoCAD Civil 3D 2015

An issue exists in AutoCAD Civil 3D 2015 where dialog windows are not displayed when executing some AutoCAD Map 3D commands. The following process will permanently correct this issue for future AutoCAD Civil 3D sessions.

- Within AutoCAD type the command OP into the command line, and click Enter (Options dialog box is opened)
- Select the Files tab and expand the Support File Search Path section
- Click the Add… button and add the path: C:\Program Files\autodesk\autocad 2015\map\support\en-us
- Click the Apply button, followed by the OK button
- Restart AutoCAD Civil 3D (a restart is required for changes to take effect)
Assigning a global coordinate system to your AutoCAD Drawing

In order to add WMS services to AutoCAD in a consistent coordinate system, it is recommended that a Global Coordinate System is assigned to your AutoCAD Drawing prior to adding any services. (NOTE: If a coordinate system is not defined by the user prior to adding WMS services, the coordinate system of first service added will be assigned to the Drawing automatically).

- Within AutoCAD, type the command `MAPWSPACE` into the command line, and click Enter. Click Enter again to select the On option and activate the Task Pane.

- Select the Map Explorer tab on the Task Pane

![Map Explorer Task Pane](image)

- Right-click on the Current Drawing text and select Coordinate System...

![Current Drawing Coordinate System](image)
• Click the **Select Coordinate System**... button

![Select Coordinate System](image1)

• In the **Search text box** type in the name of the desired coordinate system (e.g. MGA). Click on the chosen coordinate system name (e.g. MGA-55) and click the **Select** button.

![Coordinate System Library](image2)

• Click the **OK** button to assign the global coordinate system.

![Assign Global Coordinate System](image3)
Adding WMS services to AutoCAD Drawing

- In the Task Pane, select the Display Manager tab, click the Data button and select Connect to Data...

In the Data Connections by Provider list, select Add WMS Connection. In the URL box, type in a valid URL, such as:
http://services.thelist.tas.gov.au/arcgis/services/Public/TopographyAndRelief/MapServer/WMSServer Click the Connect button.

Please refer to LIST ArcGIS Server for services that support WMS capabilities (look for WMS in the top left corner)
• Leave the user name and password fields blank, and click the **Login** button.

![Login button](image)

• Select the layers to be added to your Drawing by clicking in the **Check Box** to the left of each layer name. Note that the previously set Global Coordinate System (referred to as Map Coordinate System) is listed near the bottom of the Data Connect dialog box.

![Data Connect dialog box](image)

• Click the **Add to Map** button.
References for spatial applications

- ArcMap 10.3 (Google Search)
- MapInfo Pro 12.5 (Google Search)
- QGIS 2.8.2 (Google Search)
- ArcGIS Online (Google Search)
- ArcGIS Pro 1.0 (Google Search)
- OruxMaps (Google Search)
- MotionX-GPS (Google Search)
- AutoCAD Civil 3D 2015 (Google Search)

Further support

LIST Helpdesk

Feel free to contact our helpful Client Services team by:

- **Phone:** (03) 6165 4444 or
- **Email:** listhelp@dpipwe.tas.gov.au